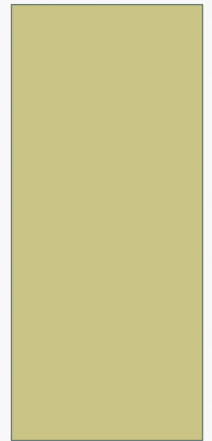


UNIT 3: THE INTEGUMENTARY SYSTEM

PLEASANT VALLEY HIGH SCHOOL
ANATOMY AND PHYSIOLOGY



CHAPTER 6:

SKIN AND THE INTEGUMENTARY SYSTEM

6.1 INTRODUCTION

- *Organ* – two or more kinds of tissues grouped together to perform a specialized function
 - By definition, the skin is an organ, the largest organ in/on the human body
 - Composed of epithelium and connective tissue and spans the entire external surface of the body
 - Used to protect the body from external intrusions

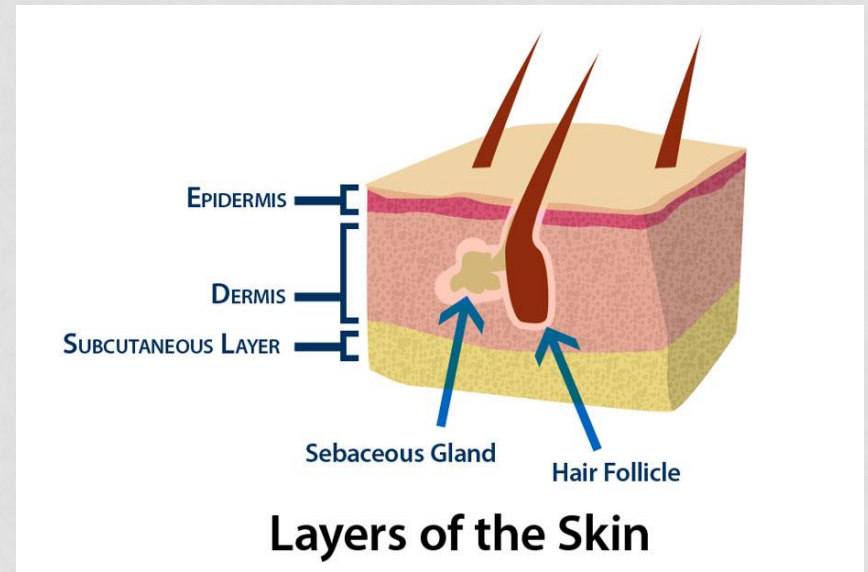
6.2 TYPES OF MEMBRANES

- Four major types of membranes associated with the integumentary system
 - Serous Membrane
 - Line body cavities that lack openings to the outside, inner linings of the thorax and abdomen
 - Secrete serous fluids, a watery fluid that lubricates membrane surface
 - Mucous Membrane
 - Line cavities and tubes that open to the outside
 - Include oral and nasal cavities and digestive, respiratory, urinary and reproductive tracts
 - Synovial Membrane
 - Form the inner linings of joint cavities between bones
 - Cutaneous Membrane
 - Skin...we have a whole unit about it...

6.3 SKIN AND ITS TISSUES

- Skin:
 - Is vital to maintaining homeostasis
 - Regulates body temperature
 - Retards water loss
 - Houses sensory receptors
 - Synthesizes biochemicals like Vitamin D
 - Excretes waste

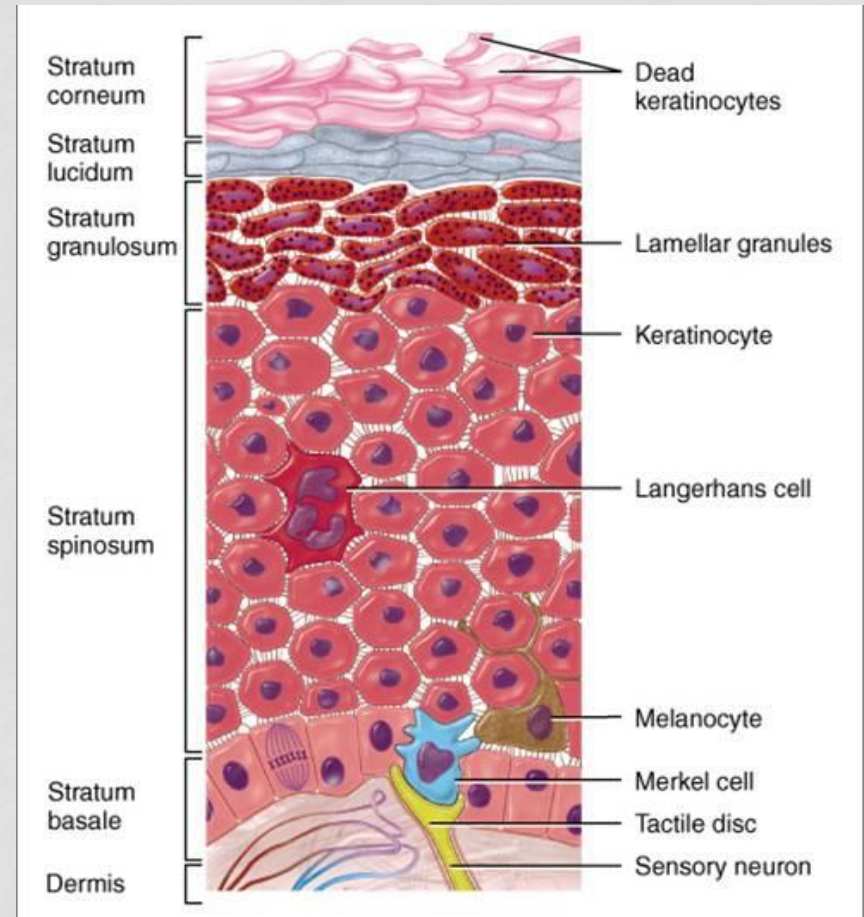
- Two layers
 - Epidermis
 - Outer layer composed of stratified squamous epithelium
 - Dermis
 - Inner layer composed of connective tissue, elastic fibers, epithelium, smooth muscle tissue, nervous tissue, and blood
 - a *basement membrane* is anchored to the dermis and separates the two layers



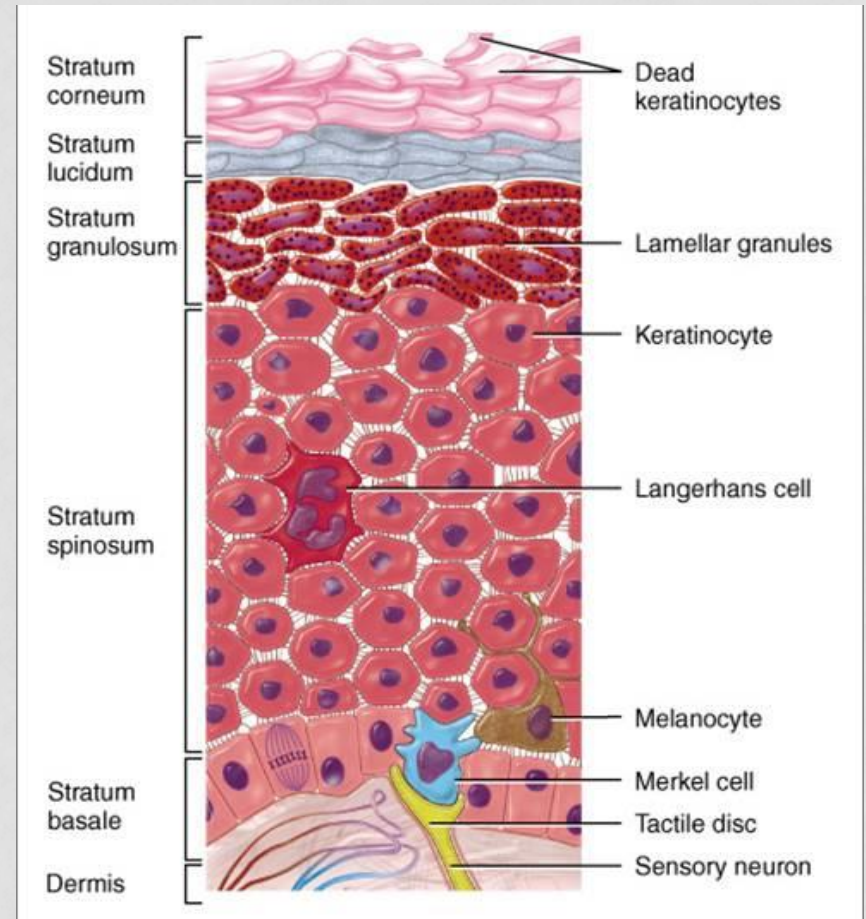
EPIDERMIS

- Avascular – no blood vessels due to its composition of squamous epithelium
- Deepest layer of epidermis is called the *stratum basale* (stratum germinativum) is nourished by blood vessels
- Older epidermal cells are pushed outwards and die
 - These older cells are called *keratinocytes*
 - They have hardened in a process called keratinization
 - The cytoplasm fills with strands of a protein called keratin and form the outer most layer of the epidermis, *stratum corneum*

- Stratum corneum
- Stratum lucidum – only in palms and feet
- Stratum granulosum
- Stratum spinosum
- Stratum basale

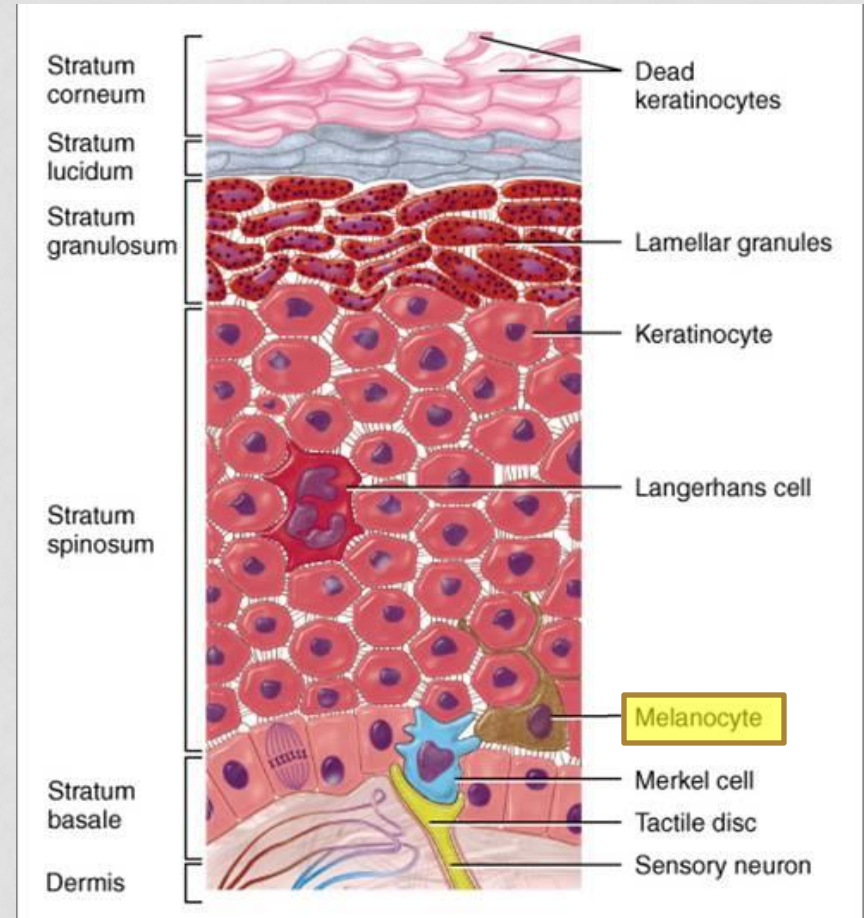


- In healthy skin, production of epidermal cells is closely balanced with the loss of cells within the stratum corneum and does not allow the skin to wear away completely



MELANOCYTES

- Specialized cells in the epidermis
- Produce *melanin*, a dark pigment that determines skin color
 - Absorb UV to prevent DNA mutations

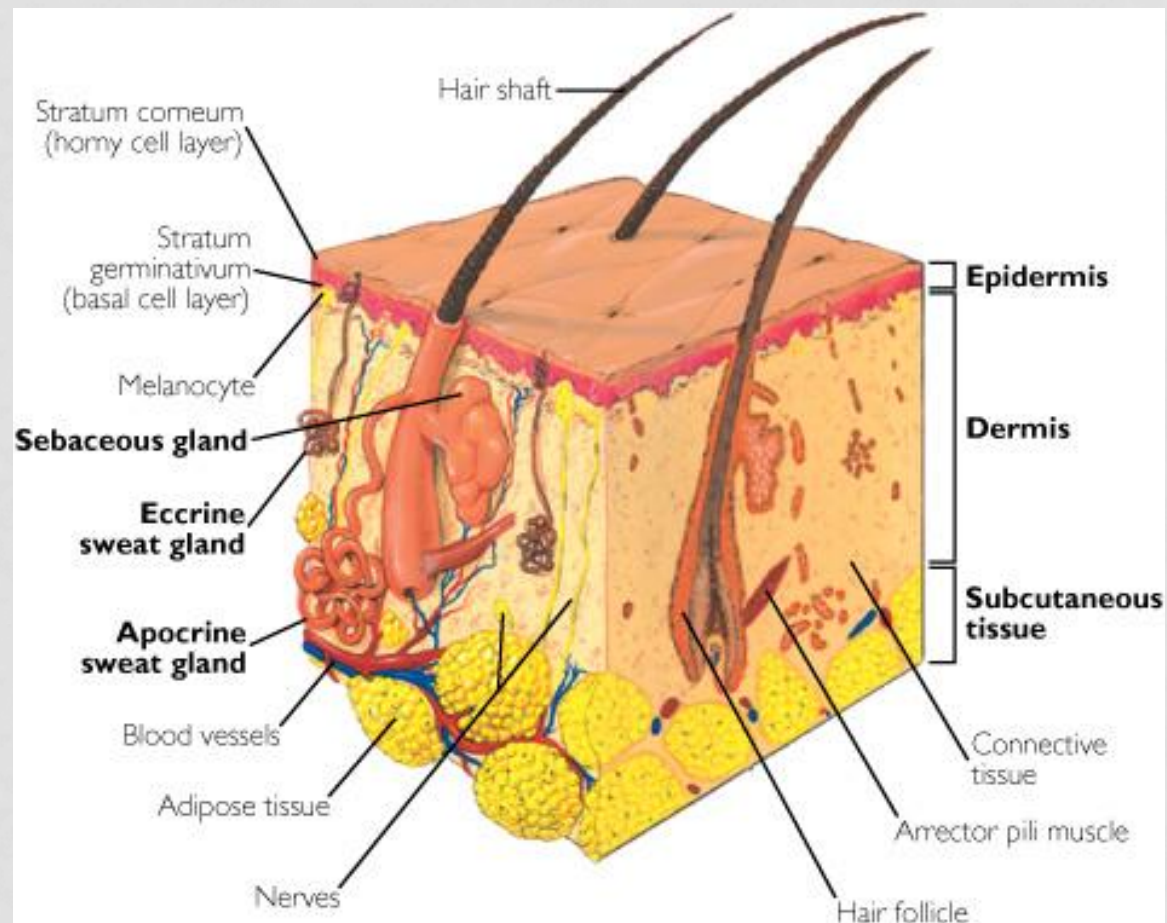


SKIN COLOR

- Determined by:
 - Concentration of melanin
 - Size of pigment granules in melanocytes
 - Blood in dermal vessels
 - Amount of UV exposure
 - Overexposure to X-rays
 - Diet
 - Lot of carotene in yellow/orange vegetables will turn skin yellow
 - When blood is high in $[O_2]$, skin appears reddish
 - When blood is low in $[O_2]$, skin appears bluish
 - Condition called cyanosis

DERMIS

- Fingerprints – result of folds in the dermal papillae
- Binds the epidermis to tissues beneath
- Gives skin toughness and elasticity
- Supplies blood supply to all skin cells and regulate temperature
- Nerve cells are scattered throughout
- Motors process are a result of impulses ending in the dermis
- Sensory receptors send signals from dermis to the brain
- Contains:
 - Hair follicles
 - Sebaceous glands (oil producing)
 - Sweat glands



SUBCUTANEOUS LAYER

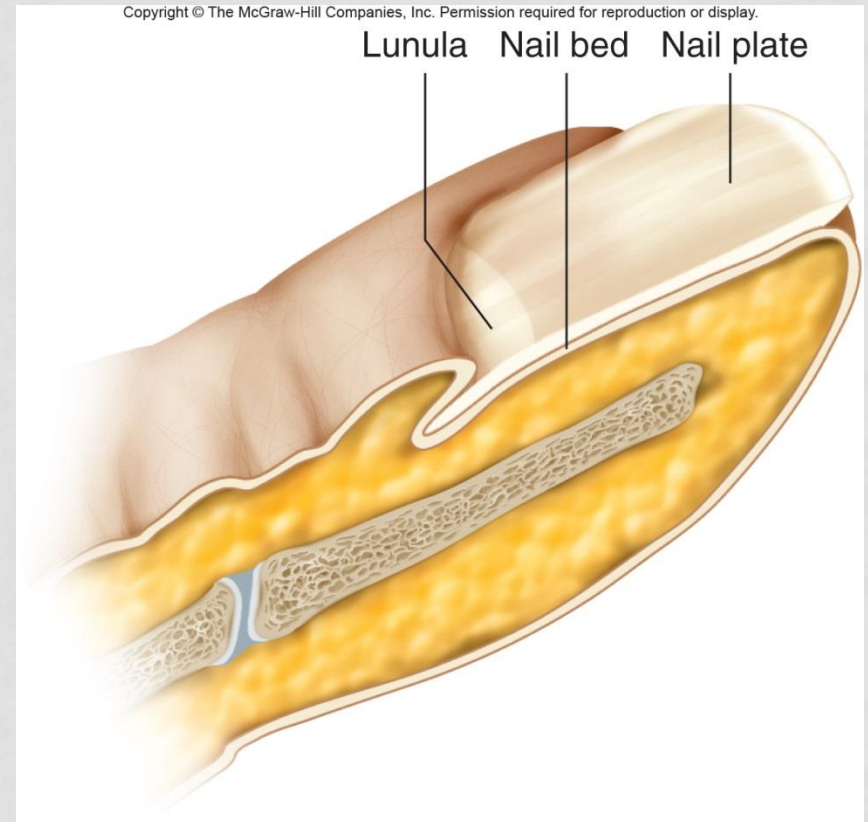
- Also called the hypodermis
- Loose connective tissue, adipose tissue, collagen, and elastic fibers
 - Fibers run parallel to the skin surface
- NO distinct layer between dermis and hypodermis
- Functions:
 - Insulation
 - Contains major blood vessels

6.4 ACCESSORY ORGANS OF THE SKIN

- Hair follicle
 - Group of epidermal cells in a tubelike depression. Hair root has blood supply. Hair shaft is dead epidermal cells
- Hair Pigment
 - Abundance of melanin = dark hair
 - Intermediate melanin = blonde hair
 - No melanin = white hair
 - Trichosiderin – pigment only found in red hair
- Arrector pilli muscle
 - Muscle responsible for “goosebumps”
- Sebaceous gland
 - Excrete fatty oil mixture of oil and cellular debris
 - Sebum - name given to mixture excreted through sebaceous gland

• Nails

- Nail plate overlies the nail bed
 - Made of specialized epithelium which becomes keratinized
- Lunula – the half moon, white spot on the nail, the most active growing site on the nail
- FYI – the thumbnail grows the slowest, the middle finger's nail grows fastest



SWEAT GLANDS

- AKA: sudoriferous glands
 - Eccrine glands – most abundant, respond to elevated body temperature, found on forehead, neck, and back
 - Apocrine gland – activate when a person is emotionally upset or uncomfortable, most common in the groin region and hair follicles
- Modified Sweat Glands:
 - Ceruminous glands
 - In the inner ear, secrete ear wax
 - Mammary glands
 - Found in the breast, secrete nutrient rich milk for progeny

6.5 TEMPERATURE REGULATION

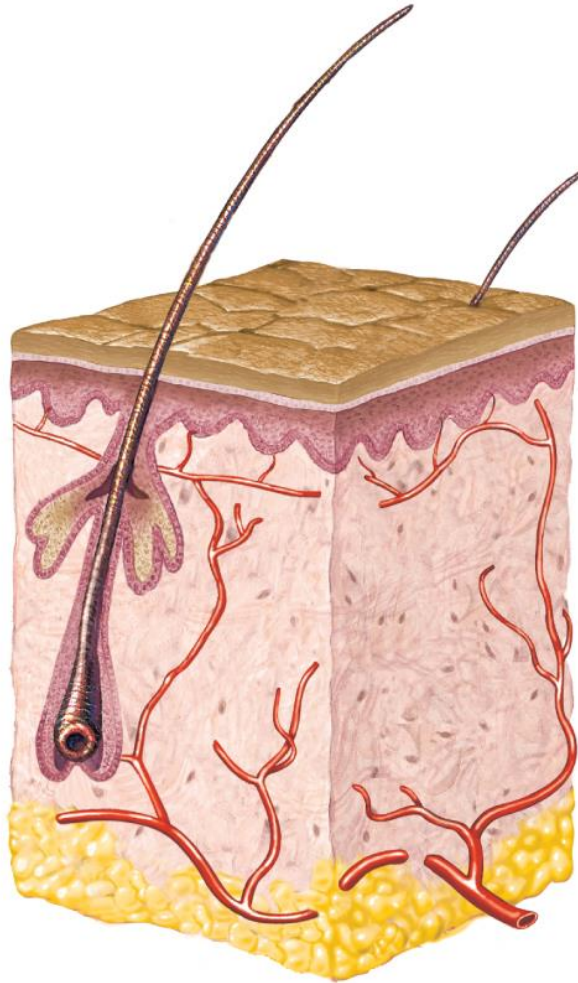
- Skin is stimulated by the nervous system to release heat when necessary
- Vasodilation – dilation of the blood vessels to increase the flow of warm blood, controlled by the hypothalamus
- Eccrine glands produce sweat to decrease temperature
- Vasoconstriction reduces blood flow and initiates shivering to maintain heat
- 80% of body heat is lost through the head

6.6 HEALING OF WOUNDS

- Inflammation – normal response to injury or stress, results in redness and swelling, painful to the touch
- Scab formation
- Newly formed CT sometimes form a scar

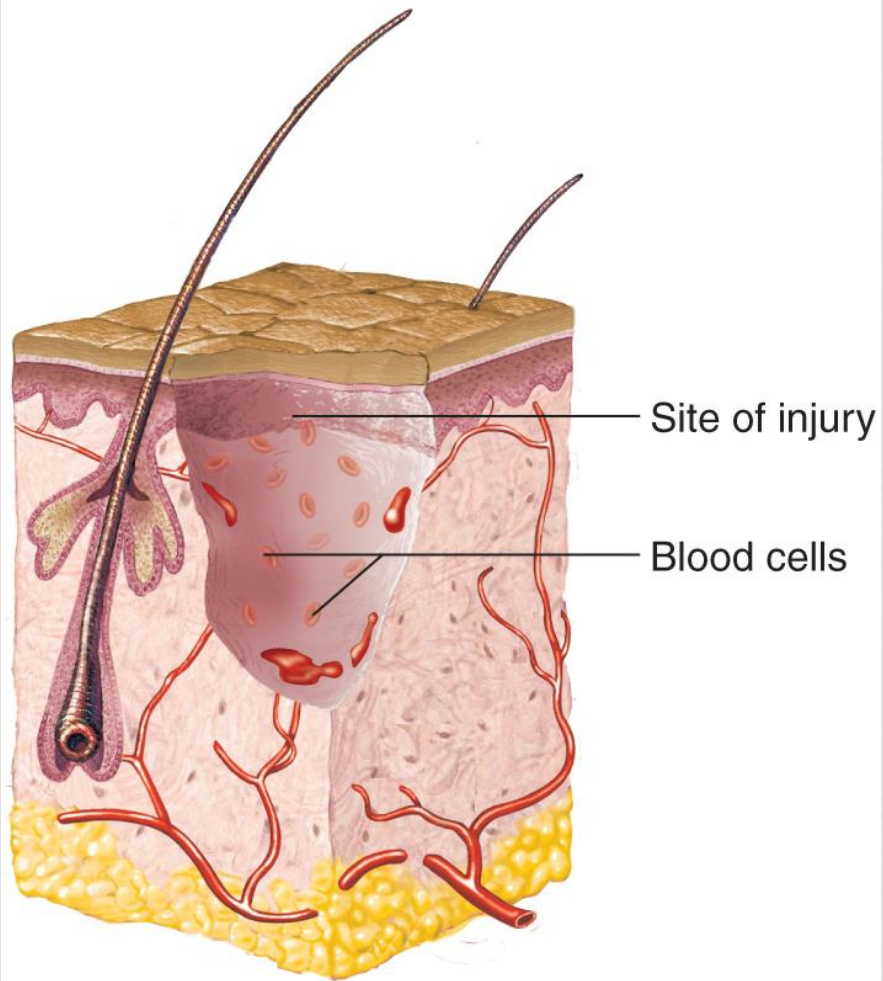
FORMATION OF A SCAB

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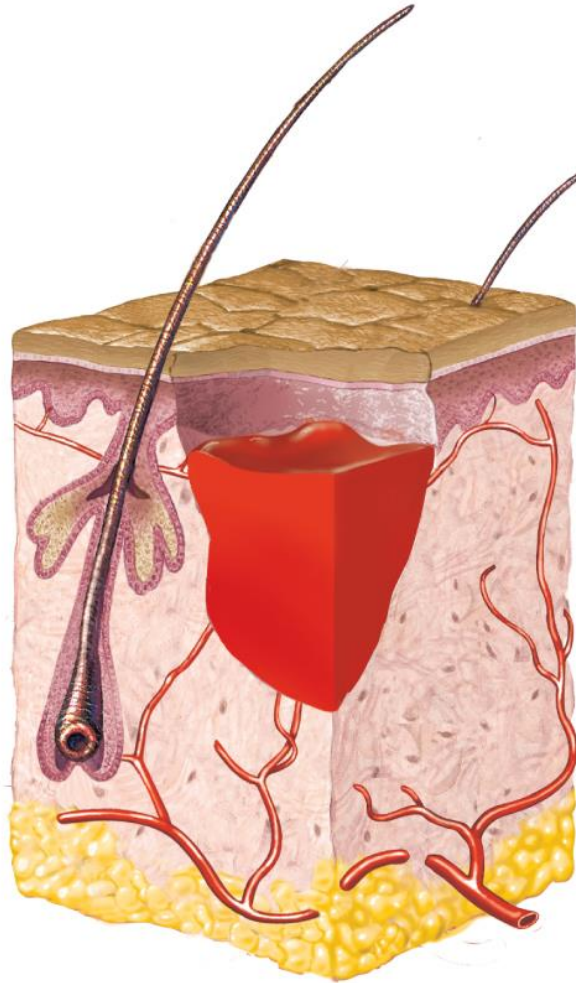
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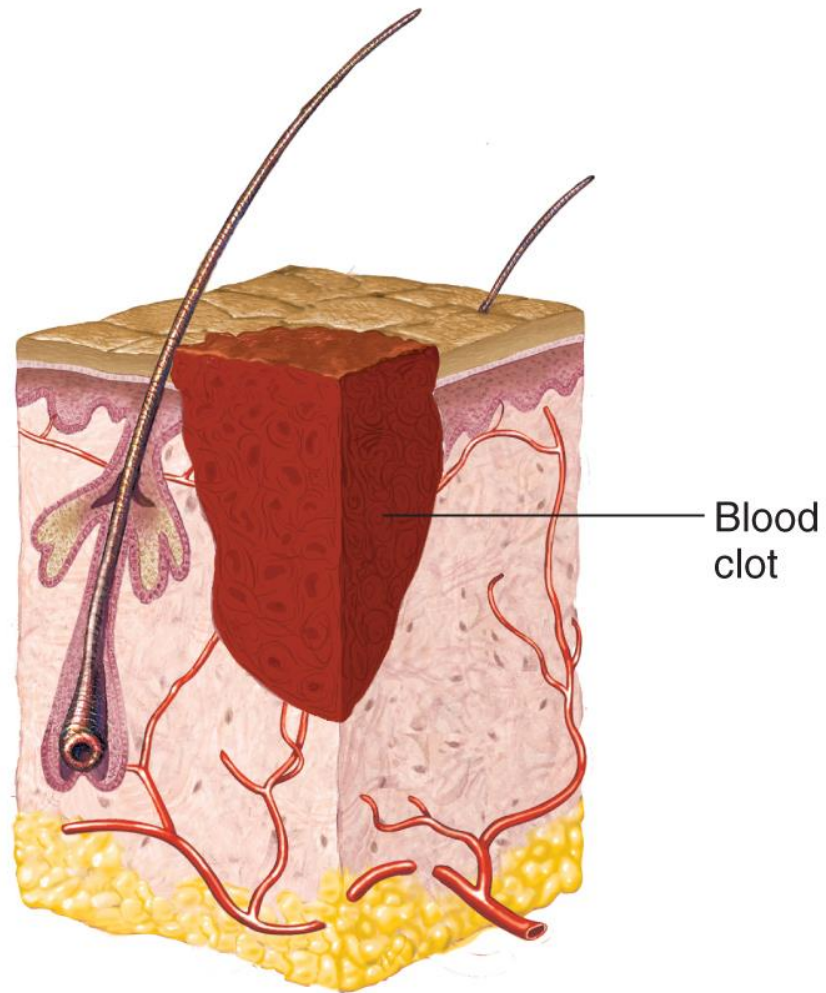
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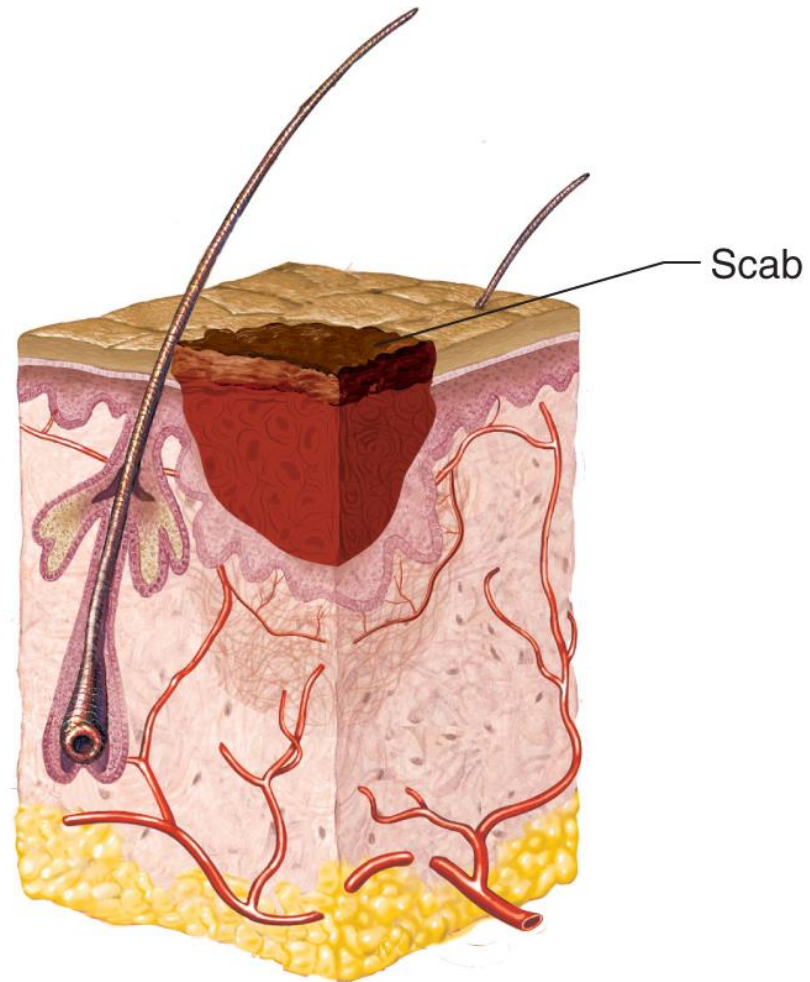
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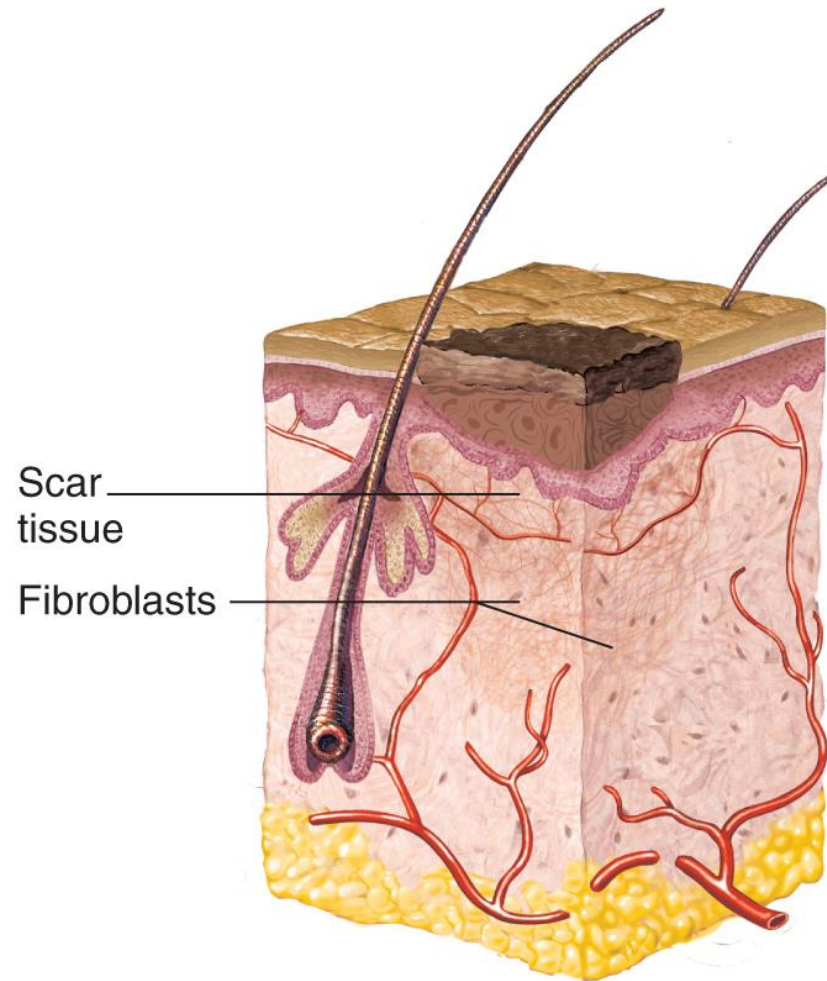
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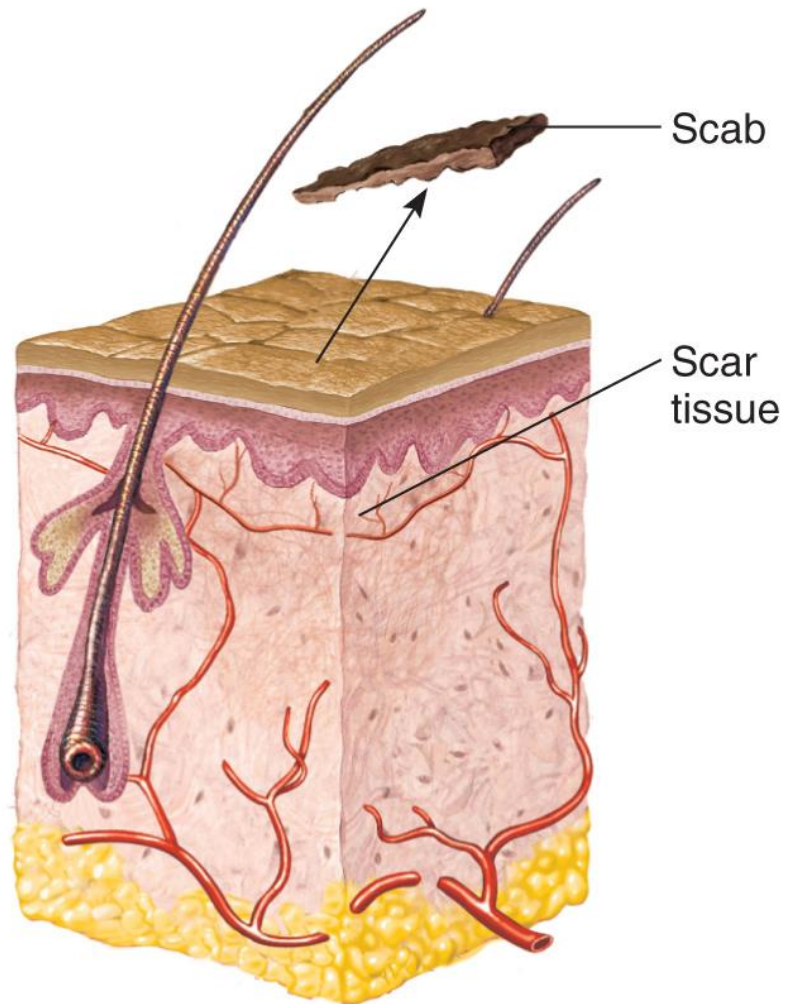
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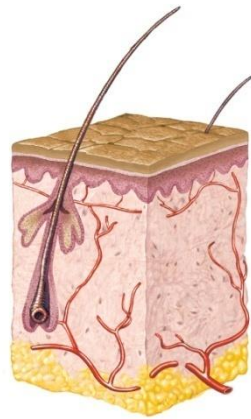


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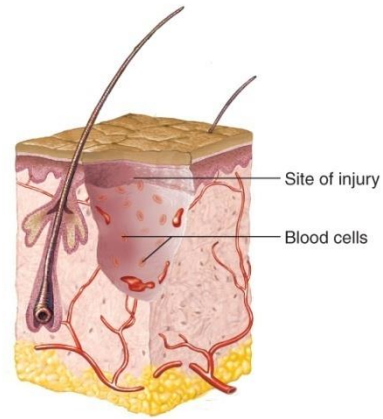
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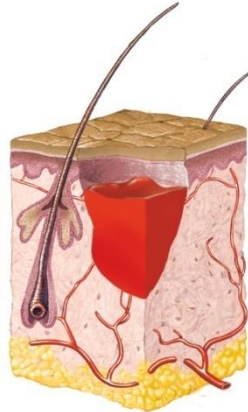
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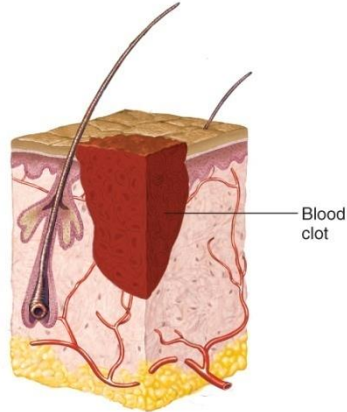
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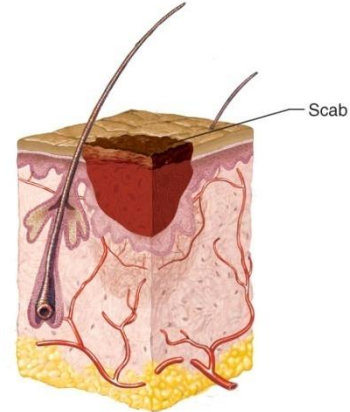
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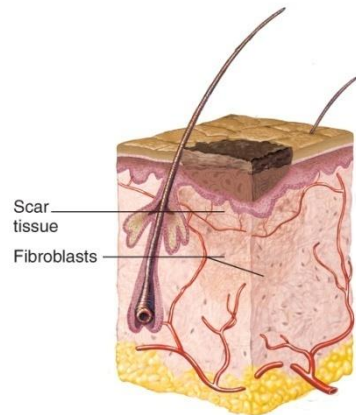
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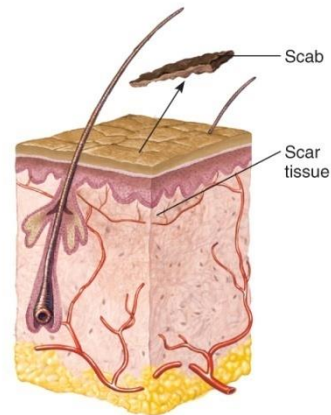
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COMMON SKIN DISORDERS

- Be familiar with these disorders:
 - Acne
 - Alopecia
 - Birthmarks
 - Boil
 - Carbuncle
 - Cyst
 - Dermatitis
 - Eczema
 - Impetigo
 - Pediculosis
 - Pruritus